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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,696	03/23/2001	Howard R. Test	TI-30589	9347

7590 04/21/2003

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EXAMINER
RICHARDS, N DREW

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 04/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/817,696	TEST ET AL.	
	Examiner	Art Unit	
	N. Drew Richards	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 7-10 and 13-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molla et al. (U.S. Patent No. 6,362,089 B1) in view of Ahmad et al. (U.S. Patent No. 5,436,412).

Molla et al. teach a method of forming metallurgical connections between metal wires and bond pads positioned on integrated circuits having copper interconnecting metallization on columns 1-6 and in figures 1-5. Specifically, Molla et al. teach activating the surface of the copper metallization of the bond pads, depositing seed metal (col. 2 line 49 through col. 3 line 24). Molla et al. then teach plating a layer of barrier meta lby electroless deposition that resists copper diffusion (col. 3 lines 25-35). Molla et al. then teach plating a layer of a bondable metal that reduces the diffusion of the barrier metal, thereby forming the outermost bondable metal layer of the bond pad (col. 3 lines 36-44). Molla et al. does not explicitly teach the bondable metal being deposited by electroless deposition, however, Molla et al. states that the layer can be formed by techniques that are well known in the art. Molla et al. teach in the background section (col. 1 lines 22-30) depositing layers on copper by electroless deposition and, for the case of gold, immersion electroless deposition. Therefore, it

would have been obvious to one of ordinary skill in the art at the time of invention to deposit the outermost bondable layer (gold) by the electroless deposition used in the background in the process of Molla et al. Molla et al. then teach bonding metal wires onto the outermost metal (col. 4 lines 13-16).

With regard to the thickness of the barrier metal reducing diffusion of the layer below by 80% compared to the diffusion in the absence of the layers, the thickness taught by Molla et al. for the barrier layer is considered to read on this limitation.

Molla et al. do not teach the bondable layer having a thickness sufficient to reduce diffusion of the barrier layer by 80%. Ahmed et al. teach a copper metallization including forming nickel and gold on copper. Ahmed et al. teach the gold being a few microns thick (col. 4 line 51). Ahmed et al. teach their metallization to provide a strengthened structure that is resistant to corrosion and provides a thicker, harder gold layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the thicker, harder gold layer of Ahmed et al. (a few microns thick). The motivation for doing so is to provide a harder layer that is resistant to corrosion. Thus, it would have been obvious to combine Molla et al. with Ahmed et al. to obtain the invention of claim 7.

With regard to claim 8, Molla et al. teach solder ball bonding and wire bonding, therefore Molla et al. is considered to teach the wire bonding step comprising ball bonding.

With regard to claim 9, Molla et al. do not teach depositing a protective overcoat over the integrated circuit including the copper and exposing the copper through the

overcoat by photolithographic techniques. Ahmad et al. teach a method of forming copper metallization in integrated circuits. Ahmad et al. teach in figure 5E depositing a protective overcoat 50 and opening selected areas of the overcoat exposing the surface of the copper metallization.

Molla et al. and Ahmad et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form a protective overcoat and etch portions away to expose the copper. The motivation for doing so is provide a passivation layer over the substrate and to insulate the copper and bonded wire from adjacent conductors. Therefore, it would have been obvious to combine Molla et al. with Ahmad et al. to obtain the invention of claim 9.

With regard to claim 10, Molla et al. teach cleaning before activating the copper surface. In combination with Ahmad et al., the cleaning step would be performed after the etching step to remove contaimants and cupric oxide. Molla et al. teach cleaning by immersing the exposed copper in a solution of sulfuric acid.

With regard to claim 13, the electroless plating of the bondable layer is immesion plating (col. 1 line 22-30).

With regard to claim 14, Molla et al. does not teach immersion plating followed by autocatalytic plating, however, this step is considered obvious as autocatalytic plating is a well known process in the art for depositing gold and Molla et al. has recognized that the gold can be formed by techniques well known to those skilled in the art. Thus, it would have been obvious to form the layer by immersion plating followed by

autocatalytic plating. It is obvious to use both methods as immersion plating is known to form thin layers while autocatalytic plating is known to form thicker layers. Thus it would have been obvious to form an initial thin layer by immersion plating and then use autocatalytic plating to provide the thicker layer.

With regard to claim 15, the limitation of electrically probing leaving no probe marks is not limiting to the process of forming the device. This step does not change the device structure in any way during the process. Further, the device of Molla et al. is capable of performing the probing step without leaving any marks as the outermost bondable layer of Molla et al. is the same as in the present invention and thus would have the same hardness to resist probe marks.

With regard to claim 16, Molla et al. teach activating the surface of the copper metallization of the bond pads, depositing seed metal (col. 2 line 49 through col. 3 line 24). Molla et al. then teach plating a layer of barrier metal by electroless deposition that has a thickness of at least .5 micrometers and is selected from the group consisting of nickel, cobalt, chromium, molybdenum, titanium, tungsten, and alloys thereof (col. 3 lines 25-35). Molla et al. then teach plating a layer of a bondable metal selected from the group consisting of gold, palladium, platinum, and silver (col. 3 lines 36-44). Molla et al. does not explicitly teach the bondable metal being deposited by electroless deposition, however, Molla et al. states that the layer can be formed by techniques that are well known in the art. Molla et al. teach in the background section (col. 1 lines 22-30) depositing layers on copper by electroless deposition and, for the case of gold, immersion electroless deposition. Therefore, it would have been obvious to one of

ordinary skill in the art at the time of invention to deposit the outermost bondable layer (gold) by the electroless deposition used in the background in the process of Molla et al. Molla et al. then teach bonding metal wires onto the outermost metal (col. 4 lines 13-16).

Molla et al. do not teach the bondable layer having a thickness of at least .4 micrometers. Ahmed et al. teach a copper metallization including forming nickel and gold on copper. Ahmed et al. teach the layers being a few microns thick (col. 4 line 51). Ahmed et al. teach their metallization to provide a strengthened structure that is resistant to corrosion and provides a thicker, harder gold layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the thicker, harder gold layer of Ahmed et al. (a few microns thick). The motivation for doing so is to provide a harder layer that is resistant to corrosion. Thus, it would have been obvious to combine Molla et al. with Ahmed et al. to obtain the invention of claim 16.

With regard to claim 17, Molla et al. do not explicitly disclose conducting a self-limiting surface metal replacement and an autocatalytic deposition. However, Molla et al. has recognized that the gold can be formed by techniques well known to those skilled in the art. Self-limiting surface metal replacement and aultocatalytic deposition processes are considered well known in the art and are thus considered taught by Molla et al. It is obvious to use both methods as immersion plating is known to form thin layers while autocatalytic plating is known to form thicker layers. Thus it would have been obvious to form an initial thin layer by immersion plating and then use autocatalytic plating to provide the thicker layer.

With regard to claim 18, the barrier layer of Molla et al. has a thickness in the range of about .5 to about 1.5 micrometers.

With regard to claim 19, the bondable layer of Molla et al. with Ahmad et al. has a thickness in the range of about .4 to 1.5 micrometers.

With regard to claim 20, Molla et al. do not teach depositing a protective overcoat over the surface of the integrated circuit including the surface having copper and metallization opening selected areas of the overcoat exposing the surface of the copper metallization. Ahmad et al. teach in figure 5E depositing a protective overcoat 50 and opening selected areas of the overcoat exposing the surface of the copper metallization.

Molla et al. and Ahmad et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form a protective overcoat and etch portions away to expose the copper. The motivation for doing so is provide a passivation layer over the substrate and to insulate the copper and bonded wire from adjacent conductors. Therefore, it would have been obvious to combine Molla et al. with Ahmad et al. to obtain the invention of claim 20.

With regard to claim 21, Molla et al. teach immersing the exposed surface of the copper metallization in an acid solution.

With regard to claim 22, Molla et al. teach depositing palladium seed metal (col. 2 lines 49 through col. 3 line 24) to activate the surface of the copper of the bond pads. Molla et al. then teach plating a layer of nickel by electroless deposition that has a thickness of at least .5 micrometers (col. 3 lines 25-35). Molla et al. then teach plating a

layer of gold (col. 3 lines 36-44). Molla et al. does not explicitly teach the gold being deposited by electroless deposition, however, Molla et al. states that the layer can be formed by techniques that are well known in the art. Molla et al. teach in the background section (col. 1 lines 22-30) depositing layers on copper by electroless deposition and, for the case of gold, immersion electroless deposition. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to deposit the gold by the electroless deposition used in the background in the process of Molla et al. Molla et al. then teach bonding metal wires onto the outermost metal (col. 4 lines 13-16).

Molla et al. do not teach the gold having a thickness of at least .4 micrometers. Ahmed et al. teach a copper metallization including forming nickel and gold on copper. Ahmed et al. teach the gold being a few microns thick (col. 4 line 51). Ahmed et al. teach their metallization to provide a strengthened structure that is resistant to corrosion and provides a thicker, harder gold layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the thicker, harder gold layer of Ahmed et al. (a few microns thick). The motivation for doing so is to provide a harder layer that is resistant to corrosion. Thus, it would have been obvious to combine Molla et al. with Ahmed et al. to obtain the invention of claim 22.

With regard to claim 23, Molla et al. do not explicitly disclose conducting a self-limiting surface metal replacement and an autocatalytic deposition. However, Molla et al. has recognized that the gold can be formed by techniques well known to those skilled in the art. Self-limiting surface metal replacement and aultocatalytic deposition

processes are considered well known in the art and are thus considered taught by Molla et al. It is obvious to use both methods as immersion plating is known to form thin layers while autocatalytic plating is known to form thicker layers. Thus it would have been obvious to form an initial thin layer by immersion plating and then use autocatalytic plating to provide the thicker layer.

With regard to claim 24, the layer of nickel of Molla et al. has a thickness in the range of about .5 to about 1.5 micrometers.

With regard to claim 25, the layer of gold of Molla et al. with Ahmad et al. has a thickness in the range of about .4 to 1.5 micrometers.

With regard to claim 26, Molla et al. do not teach depositing a protective overcoat over the surface of the integrated circuit including the surface having copper and metallization opening selected areas of the overcoat exposing the surface of the copper metallization. Ahmad et al. teach in figure 5E depositing a protective overcoat 50 and opening selected areas of the overcoat exposing the surface of the copper metallization.

Molla et al. and Ahmad et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form a protective overcoat and etch portions away to expose the copper. The motivation for doing so is provide a passivation layer over the substrate and to insulate the copper and bonded wire from adjacent conductors. Therefore, it would have been obvious to combine Molla et al. with Ahmad et al. to obtain the invention of claim 26.

3. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molla et al. with Ahmad et al. as applied to claims 7-10 and 13-26 above, and further in view of Lopatin et al. (U.S. Patent No. 6320263 B1).

With regards to claims 11 and 12, Molla et al. with Ahmad et al. teach activating the copper surface by immersing the bond pads in a metal solution but do not teach the solution is a metal chloride or specifically palladium chloride. Lopatin et al. teach activating the copper surface and teach activating by immersion in a palladium chloride solution.

Molla et al. with Ahmad et al. and Lopatin et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to activate the copper by immersing in a palladium chloride solution. The motivation for doing so is to prepare the surface for further metal deposition. Therefore, it would have been obvious to combine Molla et al. and Ahmad et al. with Lopatin et al. to obtain the invention of claims 11 and 12.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 7-26 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16-25 of copending Application No. 09/775322. Although the conflicting claims are not identical, they are not patentably distinct from each other because the same process is claimed in both applications even though the barrier layer and bondable layer have been claimed by different physical properties.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

6. Applicant's arguments filed 4/3/03 with respect to claims 7-26 have been considered but are not found persuasive.

Applicant argues that the thickness of the gold layer taught by Ahmad does not read on the claimed thickness of at least .4 micrometers. This is not persuasive as Ahmad teach their 3 layer metallization having a thickness of a few microns. Thus, it is obvious that each metallization layer would have approximately 1 micron in thickness. The claims only require .4 microns or more and thus Ahmad teach the claimed thickness.

With regard to the argument that it would not have been obvious to use electroless plating and autocatalytic plating, the rejection has been further explained in

this office action to give proper motivation as to why one of ordinary skill in the art would have desired to use both methods. Thus, this rejection is deemed proper.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (703) 306-5946. The examiner can normally be reached on M-F 8:00-5:30; Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

NDR
April 17, 2003

SHEILA V. CLARK
PRIMARY EXAMINER

Please type a plus sign (+) inside this box →

PTO/SB/08A (08-00)
Approved for use through 10/31/2002. OMB 0651-0031
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for Form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 2

Complete If Known	
Application Number	09/817,696
Filing Date	Herewith
First Named Inventor	Howard R. Test, et al.
Group Art Unit	2815
Examiner Name	Richards, N.D.
Attorney Docket No.	TI-30589

U.S. PATENT DOCUMENTS

Exam. Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Doc.	Date of Pub. of Cited Doc. (mm-dd-yyyy)	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA	4,808,769		Nakano, et al.	02/28/1989	
	AB	4,857,671		Nakano, et al.	08/15/1989	
	AC	4,970,571		Yamakawa, et al.	11/13/1990	
	AD	5,212,138		Krulik, et al.	05/18/1993	
	AE	5,291,374		Hirata, et al.	03/01/1994	
	AF	5,380,560		Kaja, et al.	01/10/1995	
	AG	5,656,858		Kondo, et al.	08/12/1997	
	AH	5,747,881		Hosomi, et al.	05/05/1998	
	AI	5,766,979		Budnaitis	06/16/1998	
	AJ	5,801,452		Farnworth, et al.	09/01/1998	
	AK	5,821,627		Mori, et al.	10/13/1998	
	AL	5,906,312		Zakel, et al.	05/25/1999	
		5,910,644		Goodman, et al.	06/08/1999	
	AM	5,937,320		Andricacos, et al.	08/10/1999	
	AN	6,008,543		Iwabuchi	12/28/1999	
	AO	6,040,239		Akram, et al.	03/21/2000	
	AP	6,049,130		Hosomi, et al.	04/11/2000	
	AQ	6,077,723		Farnworth, et al.	06/20/2000	
	AR	6,091,252		Akram, et al.	07/18/2000	
	AS	6,094,058		Hembree, et al.	07/25/2000	
	AT	6,097,087		Farnworth, et al.	08/01/2000	
	AU	6,306,751 B1		Patel, et al.	10/23/2001	
	AV	6,445,069 B1		Ling, et al.	09/03/2002	

FOREIGN PATENT DOCUMENTS

Exam. Initials*	Cite No.[1]	Foreign Patent Document Office[3]	Number[4]	Kind Code[2] (if known)	Name of Patentee or Applicant of Cited Doc.	Date of Pub. of Cited Doc. (mm-dd-yyyy)	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	BA		JP 411140658 A		Hitachi Chem Co. Ltd.	25/05/1999		
	BB							
	BC							
	BD							

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]Unique citation designation number. [2]See attached Kinds of U.S. Patent Documents. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached.

Please type a plus sign (+) inside this box → [+]

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 2 Of 2

Complete If Known	
Application Number	*09/817,696*
Filing Date	*Herewith*
First Named Inventor	*Howard R. Test, et al.*
Group Art Unit	*2815*
Examiner Name	*Richards, N.D.*
Attorney Docket No.	*TI-30589*

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS			
Exam. Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	CA	"A Low-Cost Electroless Plating Method for Producing Flip-Chip Bondable and Wire-Bondable Circuit Pads for Smart Pixel Application", Madhumita Datta, et al., IEEE, Laboratory of Physical Sciences, and Dept. of Electrical Engineering, 1998, pp. 99-100	
	CB	"Autocatalytic Gold Plating Process for Electronic Packaging Applications", John G. Gaudiello, IEEE, Electronic Components and Technology Conference, 1995, pp. 534-537	
	CC	"Break Through Developments in Electroless Nickel/Gold Plating on Copper Based Semiconductors", Andrew J. G. Strandjord, et al., 2000 International Symposium on Advanced Packaging Materials, 2001, pp. 107-111	
	CD	"Contact and Connection Properties of Autocatalytically 16.1 Increased Gold-Deposits", R. Freudenberger, et al., Proceedings of the Forty-Second IEEE Holm Conference on Electrical Contacts, 1996, Joint with the 18th International Conference on Electrical Contacts, 1996, pp. 461-466	
	CE	"Crystallization of Electroless Ni-P Under Bump Metallization Induced by Solder Reaction", J. W. Jang, et al., 1999 International Symposium on Advanced Packaging Materials, pp. 252- 255	
	CF	"Direct Electroless Nickel Plating on Copper Circuits Using DMAB as a Second Reducing Agent", Hideto Watanabe, et al., 1998 IEMT/IMC Proceedings, pp. 149-153	
	CG	"Electrolessly Deposited Diffusion Barriers for Microelectronics", E. J. O'Sullivan, et al., IBM J. Res. Develop., Vol. 42, No. 5, 09/1998, pp. 607-620	
	CH	"Electroless Metal Deposition for Back-End Wafer Processes", A. Ostmann, et al., Advancing Microelectronics, May/June 1999, pp. 23-26	
	CI	"Electroless Palladium Finish For Bonding Fine-Pitch Devices", George M. Milad, et al., Proceedings of the Technical Program, NEPCON West '96 Conference, 02/1996, pp. 1333-1341	
	CJ	"Flip Chip Technologies", HBS Mark II Automatic Electroless Nickel/Immersion Gold Plate Tool, Technical Proposal #990505-2.OSH, 05/1999, pp. 3-11	
	CK	"Low Cost Flip Chip Bumping Technologies", CL Wong, et al., IEEE/CPMT Electronic Packaging Technology Conference, 1997, pp. 244-250	
	CL	"Metallization for Direct Solder Interconnection of Power Devices", Shatil Haque, et al., 2000 Electronic Components and Technology Conference, pp. 1475-1482	
	CM	"Performance of Evaporated and Plated Bumps", Addi Mistry, et al., 1998 IEEE/CPMT International Electronics Manufacturing Technology Symposium, pp. 1-7	
	CN	"Solder Flip Chips Employing Electroless Nickel: An Evaluation of Reliability and Cost", Frank Stepniak, InterPACK '97 Final Draft, pp. 1-6	
	CO	"Thermosonic Gold Ball Bonding to Alternate Plating Finishes on Laminate MCM Substrates", Chris Dunn, et al., 1997 International Conference on Multichip Modules, 1997, pp. 170-176	
	CP	"Thermosonic Gold Wire Bonding to Palladium Finishes on Laminate Substrates", R. Wayne Johnson, et al., 1998 International Conference on Multichip Modules and High Density Packaging, pp. 291-299	
	CQ	"Thermosonic Gold Wirebonding to Electrolessly-Metallized Copper Bondpads Over Benzocyclobutene", Richard Ulrich, et al., 1999 International Conference on High Density Packaging and MCMs, pp. 260-265	
	CR		

Examiner Signature		Date Considered	4/17/03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]Unique citation designation number. [2]Applicant is to place a check mark here if English Translation is attached.

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